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TITLE: COOLING SHEET AGENT

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NAME COUNTRY  
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APPL-NO: JP10224623  
APPL-DATE: August 7, 1998

INT-CL (IPC): A61F007/02

ABSTRACT:

PROBLEM TO BE SOLVED: To provide a cooling sheet which is enhanced in the cooling effect of an affected part and, further, is enhanced in the adhesion property to the skin by incorporating moisture, alcohol, etc., in a large amt. into the supporting body itself of a cooling sheet agent, for example, a nonwoven fabric itself, thereby increasing the amt. of vaporization and prolonging the duration time of a cooling effect.

SOLUTION: This cooling sheet agent is formed by using a nonwoven fabric of superabsorptively worked fibers consisting of an acrylic fiber subjected to superwater absorption finishing as an intermediate layer, impregnating this intermediate layer with a liquid having a cooling effect, using a nonwoven fabric sheet consisting of a rayon fiber as a lower layer which is the side in tight contact with the skin of the intermediate layer, using the nonwoven fabric consisting of the fibers of any of polyester(PET), polypropylene(PP) or nylon or the fibers formed by blending of these fibers as the upper layer which is the outer side of the intermediate layer and entangling the

layers of the respective nonwoven fabrics, thereby bonding three layers of the nonwoven fabrics.

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WEEK:

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TITLE: Non-woven fabric for cooling skin in medical application,  
includes super water absorbent fiber as intermediate layer,  
rayon yarn as inner layer and non -absorbent fiber as outer  
layer respectively

INVENTOR: IKEDA T

PATENT-ASSIGNEE: FINE MEDICAL KK[FINEN]

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TYPE	IPC DATE
CIPP	<u>A61 F 7/02</u> 20060101

ABSTRACTED-PUB-NO: JP 2000051260 A

BASIC-ABSTRACT:

NOVELTY - The non-woven fabric includes three layers in which the intermediate layer (2) is made of a super water absorptive acrylic fiber and is impregnated with alcohol which provides cooling effect to diseased part.

DETAILED DESCRIPTION - The outer layer (3) is made of polyester or polypropylene or nylon. The inner layer (1) which contacts the skin

is made of rayon yarn which improves adhesion to the skin. A split (4) penetrates from upper layer (3) to lower layer (1).

USE - For cooling the skin for medical application and beauty.

ADVANTAGE - Improves cooling effect to the diseased part since the intermediate layer is made of super water absorptive acrylic fiber. Improves adhesion to the skin, since split penetrates from upper layer to lower layer expands into a right angled direction and towards the skin. Since the outer layer has non-absorbent fibers the outer layer is always maintained dry.

DESCRIPTION OF DRAWING(S) - The figure shows the isometric view of the non-woven fabric. (1) Inner layer; (2) Intermediate layer; (3) Outer layer; (4) Split.

CHOSEN- Dwg.2/6

DRAWING:

TITLE- NON WOVEN FABRIC COOLING SKIN MEDICAL APPLY SUPER WATER  
TERMS: ABSORB INTERMEDIATE LAYER RAYON YARN INNER OUTER  
RESPECTIVE

DERWENT-CLASS: A96 D22 P32

CPI-CODES: A04-F01A; A12-V04C; D08-B09A; D09-A;

ENHANCED- Polymer Index [1.1] 018 ; G3634 G3623 D01 D03 D11 D10  
POLYMER- D23 D22 D31 D42 D50 D76 D86 F24 F29 F26 F34 H0293 P0599  
INDEXING: R24077 R01852 192544 90356; S9999 S1183 S1161 S1070;

Polymer Index [1.2] 018 ; K9698 K9676; K9574 K9483;  
K9518 K9483; ND01; Q9999 Q7987\*R; Q9999 Q7669; Q9999  
Q8015 Q7987;

Polymer Index [2.1] 018 ; G0475\*R G0260 G0022 D01 D12  
D10 D26 D51 D53 F12; H0000; H0011\*R; S9999 S1070\*R;  
S9999 S1183 S1161 S1070; P0088;

Polymer Index [2.2] 018 ; K9698 K9676; K9574 K9483;  
K9518 K9483; ND01; Q9999 Q7987\*R; Q9999 Q7669; Q9999  
Q8015 Q7987;

Polymer Index [2.3] 018 ; B9999 B3407 B3383 B3372;

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S1183 S1161 S1070;

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D10 D51 D53 D58 D83 R00964 1145; H0000; S9999 S1183  
S1161 S1070; P1150; P1343;

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S1161 S1070;

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K9518 K9483; ND01; Q9999 Q7987\*R; Q9999 Q7669; Q9999  
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**Notes:**

1. Untranslatable words are replaced with asterisks (\*\*\*).
2. Texts in the figures are not translated and shown as it is.

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Dictionary: Last updated 04/11/2008 / Priority: 1. Fiber/Clothing material / 2. Industrial Products / 3. Chemistry

[Document Name] Description

[Title of the Invention] Cooling sheet agent

[Claim(s)]

[Claim 1] While infiltrating the liquid which makes an intermediate layer the nonwoven fabric of the super-absorptivity fiber which consists of acrylic fiber which carried out super-water absorption processing, and has a chilling effect to this intermediate layer The lower layer which becomes the side stuck to this intermediate layer's skin is used as the nonwoven fabric sheet which consists of a rayon fiber. The cooling sheet agent which uses the upper layer used as this intermediate layer's outside as the nonwoven fabric which consists of a fiber which mixed which fiber of polyester (PET) polypropylene (PP) nylon, or these, and is characterized by combining the nonwoven fabric of three layers by twining the layer of each nonwoven fabric.

[Claim 2] It is the cooling sheet agent according to claim 1 characterized by having prepared the break penetrated in a lower layer from the upper layer in said cooling sheet, and having arranged this break in parallel by plurality.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention belongs to the technical field of the cooling sheet agent which cools the skin a sake [ the object for Medical Science Division, and for cosmetics ].

[0002]

[Description of the Prior Art] What spread and applied the gel plaster body which made the subject the water soluble polymer which absorbs many moisture comparatively as a cooling sheet agent for the object for Medical Science Division and cosmetics generally used at the nonwoven fabric is known conventionally.

[0003]

[Problem to be solved by the invention] [ an agent ] although the cooling sheet agent the above-mentioned conventional object for Medical Science Division and for cosmetics generally used cools what the water soluble polymer gelled including water by hitting against skin There is a limit in the amount of water absorption, sufficient quantity cannot necessarily be absorbed, since it was a water soluble polymer, only a fixed quantity of alcohols could usually be contained, but the volatilization rate of moisture was bad, therefore the chilling effect was also inadequate. Moreover, the adhesion base material by a water soluble polymer remained in skin, and there was a problem that a rash might arise to skin.

[0004] moreover, as a cooling sheet agent for the object for Medical Science Division, and cosmetics generally used With adhesives etc., use as a water absorption layer the nonwoven fabric which consists of a fiber which absorbs many moisture comparatively, an outer layer carries out seal treatment so that water may not leak, and KOTENGU material as KOTENGU material Although films, such as polyethylene (PE), polypropylene (PP), ethylene acid vinyl (EVA), and polystyrene (PS), can be considered The nonwoven fabric of the usual absorptivity is also inadequate for making liquefied vaporization \*\*\*\*\* , such as water, an alcohol, etc. with

a chilling effect, contain so much. [ a cooling operation does not last long and / the gas of the liquefied volatilization component in a cooling sheet ] Although are prevented by the seal film, and do not emit outside, there is a problem that a cooling operation is checked, the nonwoven fabric which absorbs the usual moisture also has the problem that the adhesion to skin is bad and the nonwoven fabric of a water absorption layer and the film of the outer layer use adhesives etc. There are a problem that adhesives melt with water etc. and each layer dissociates, and a problem that it is and the adhesives themselves which melted produce skin hindrance, such as a rash of the skin and an itch.

[0005] This invention was made in view of the above-mentioned problem, and [ the technical problem ] By making it contain moisture, an alcohol, etc. so much, the base material (for example, the nonwoven fabric itself) itself of a cooling sheet agent It is offering the cooling sheet which increased a volatile quantity, lengthened temporal duration of the chilling effect, raised the transpiration power and evaporation power of volatilization components, such as moisture and an alcohol, heightened the chilling effect of the affected part, and increased the adhesion to skin further.

[0006]

[Means for solving problem] In order to solve the above-mentioned technical problem, [ invention according to claim 1 ] While infiltrating the liquid which makes an intermediate layer the nonwoven fabric of the super-absorptivity fiber which consists of acrylic fiber which carried out super-water absorption processing, and has a chilling effect to this intermediate layer The lower layer which becomes the side stuck to this intermediate layer's skin is used as the nonwoven fabric sheet which consists of a rayon fiber. It is the cooling sheet agent which combined the nonwoven fabric of three layers by using the upper layer used as this intermediate layer's outside as the nonwoven fabric which consists of a fiber which mixed which fiber of polyester (PET) polypropylene (PP) nylon, or these, and twining the layer of each nonwoven fabric. [ the operation / an intermediate layer ] since a lot of moisture is absorbed by the super-absorptivity fiber While a cooling operation increases, a lot of moisture which the surface always maintained the dry feeling also for durability since increase and the upper layer were the nonwoven fabrics of the fiber which does not absorb moisture, and was absorbed by the super-absorptivity fiber evaporates, a steam is emitted outside from the crevice between the eyes of a nonwoven fabric, evaporation of a liquid is promoted, and a



cooling operation increases. Moreover, since the lower layer of the cooling sheet considered it as the nonwoven fabric which consists of a rayon fiber, it has the operation whose adhesion to skin improves. Furthermore, it has the operation that binding of three layers is not cleared with moisture, by having twined the fiber of each layer by the needle punch method etc. in piles, and having combined the nonwoven fabric of three layers with the physical variance (mechanical).

[0007] In order to solve the above-mentioned technical problem, [ invention according to claim 2 ] In addition to the composition of Claim 1, the break penetrated in a lower layer from the upper layer of a cooling sheet is prepared, this break is a cooling sheet agent arranged in parallel by plurality, and with the direction of a break, if that operation is pulled in the right-angled direction and it hits against skin, adhesion's to skin will improve further.

[0008]

[Mode for carrying out the invention] The work example and comparative example which are a good form [ \*\*\*\* ] are hereafter given to this invention, and this invention is explained concretely.

[0009] [Work example 1] Although work examples 1 are an object for Medical Science Division, and a cooling sheet agent for cosmetics, the super-absorptivity fiber run seal F (registered trademark: TOYO BOSEKI KABUSHIKI KAISHA) is used for them as a base material to be used. This super-absorptivity fiber is two-layer structure with the outer layer which carried out super-water absorption processing by the special method, and the inner layer which is acrylic fiber, if it contacts water, it will absorb water promptly and it will swell, and since the heart is still acrylic fiber, fiber physical properties are compound functional fiber which maintained the physical properties of acrylic fiber. and the physical properties of the above-mentioned super-absorptivity fiber run seal F are as follows -- it is.

[0010]

[Table 1] Denier x fiber length 1.5d x the amount of 51mm water absorption Pure water (distilled water) (a) 150 ml/g 0.9% brine 50 ml/g The amount of water retention under load 1% brine (b) 20ml/g

[0011] However, measurement of the amount of water absorption of the above (a) immerses the 0.4g super-absorptivity fiber run seal F in 300ml pure water. It is neglected for 30 minutes, agitating, and it pours on the sieve of 32 meshes after that, a drainer is carried out for 10 minutes, and the quantity of the super-absorptivity fiber run seal F of the shape of a gel which remained on the mesh is calculated by the following formula.

[0012]

[Mathematical formula 1] Amount (ml/g) of water absorption = (gel weight - 0.4) / 0.4

[0013] Moreover, measurement of the amount of water retention under the load of the above (b) makes brine absorb water enough 1% to the nonwoven fabric of the super-absorptivity fiber run seal (10cm x 10cm) F (about 50 ml/g), after it drains off water, it puts 5kg of load on this, and it measures the weight of a subsequent nonwoven fabric. And as mentioned above, a lot of water is absorbed, even if it applies some pressures, water is not repelled, but water absorption velocity also already reaches 70% of the amount of balanced water absorption in \*\* 30 seconds, and a super-absorptivity fiber swells and swells by about 12 times the diameter of the original acrylic fiber. Moreover, there is no toxicity and it has the characteristics that hardness does not fall from acrylic fiber, either.

[0014] [ as the cooling sheet of a work example 1 is shown in the following [table 2], use the above-mentioned super-absorptivity fiber here as a base material to be used, but ] Make this cooling sheet agent into an intermediate layer, and the lower layer which becomes the side stuck to an intermediate layer's skin considers it as the nonwoven fabric which consists of a rayon fiber. The upper layer used as this intermediate layer's outside used the liquid as the nonwoven fabric of the hardly absorbed polyester (PET), combined each layer for the nonwoven fabric of three layers by the needle punch method in piles, and set thickness of the whole cooling sheet to about about 1.3mm. see the upper layer 1 in drawing 2 about a work

example 2, an intermediate layer 2, and the lower layer 3)

[0015] [ thus, the upper layer of the manufactured cooling sheet ] A lot of moisture which the surface always maintained the dry feeling since it was the nonwoven fabric of the polyester (PET) which does not absorb moisture, and was absorbed by the super-absorptivity fiber evaporates, a steam is emitted outside from the crevice between the eyes of a nonwoven fabric, evaporation of a liquid is promoted, and a cooling operation increases. Moreover, the lower layer of the cooling sheet was taken as the nonwoven fabric which consists of a rayon fiber in order to raise the adhesion to skin. Furthermore, since a super-absorptivity fiber absorbs a lot of purified water, [ the upper layer and an intermediate layer, and lower layer binding ] Use of a binder etc. is unsuitable, and by having twined the fiber of each layer by the needle punch method in piles, and having combined the nonwoven fabric of three layers with the physical variance (mechanical) as mentioned above, even if a lot of moisture exists, binding of three layers does not solve it.

[0016] on the other hand, although the comparative example for explaining the function of a work example 1 is explained, it is a thing using the nonwoven fabric which replaces the cooling sheet of a comparative example with the super-absorptivity fiber of a work example 1, and is used for the usual cooling sheet -- the following [table 3] -- \*\* -- it needs.

[0017]

[Table 2] [Composition of the cooling sheet of a work example 1] Quality of the material Fiber (denier x fiber length) Organization The amount-used upper layer : Polyester (PET) 1.5d x 51mm 90 weight % Nonwoven fabric 50g/m<sup>2</sup> 6.0 d x 64mm 10-weight % intermediate layer : Super-absorptivity fiber 1.5d x 51mm 100 weight % Nonwoven fabric 80g/m<sup>2</sup> (run seal F (registered trademark: TOYO BOSEKI KABUSHIKI KAISHA)) lower layer : Rayon 1.5d x 38mm 100 weight % Nonwoven fabric 30g/m<sup>2</sup> (Sepang race: nonwoven fabric which carried out confounding with the jet stream)

[0018]

[Table 3] [Composition of the cooling sheet of a comparative example] Quality of the material A fiber (denier x fiber length) An organization The amount-used upper layer : Polyester (PET) 1.5d x 51mm 90 weight % Nonwoven fabric 50g/m<sup>2</sup> 6.0 d x 64mm 10-weight % intermediate layer : Rayon 1.5d x 51mm 100 weight % Nonwoven fabric 80g/m<sup>2</sup> lower layer : Rayon 1.5d x 38mm 100 weight % Nonwoven fabric 30g/m<sup>2</sup> (Sepang race)

[0019] here -- sodium polyacrylate -- 60-70 degrees C -- warming -- after dissolving in purified water, agitating in the bottom, it was neglected in ordinary temperature, and ethyl alcohol could be added, it mixed, and immersion fluid was adjusted. It took out, after the cooling sheet (13cm x 5cm) of the work example 1 of the above-mentioned [table 2] and the cooling sheet (13cm x 5cm) of the comparative example of [Table 3] were immersed in this immersion fluid for about 5 minutes, and it was considered as the sample for an examination. The amount of absorption of the immersion fluid of both cooling sheets (maximum) is set on the cooling sheet of a work example 1. In 11.0 ml and the cooling sheet of a comparative example It was 1.0ml.

[0020] in addition, the [table 4] of the following [ presentation / of immersion fluid ] -- it needs.

[0021]

[Table 4] Presentation ethyl alcohol of immersion fluid

---

5 Weight Part

Sodium polyacrylate

---

0.2 weight part

Purified water

---

94.8 weight parts

Inclusive sum 100.0 weight parts

[0022] The comparative study method stuck both the cooling sheet agent adjusted by the above-mentioned method behind [ left ] the healthy 28 years-old adult man (weight of 57kg)

under the room temperature of 27 degrees C, and the room condition of 60% of humidity, and measured the skin temperature of the pasting part temporally using core temp PD-K161 (made by TERUMO KABUSHIKI KAISHA). Moreover, the cooling sheet agent of the comparative example was stuck behind [ right ] the test subject under the same conditions using the same test subject 3 hours afterward, and the skin temperature of the pasting part was measured by the same method as the above. Although the experimental result of the above-mentioned work example 1 and a comparative example is shown in the graph of drawing 1 As shown in a solid line A, [ the cooling sheet agent of the work example of this invention ] The skin temperature of the pasting part descended quickly after pasting, the minimum skin temperature was reached in after-pasting 6 minutes and 00 seconds, and as compared with pasting before, skin temperature low about 3.5 degrees C was shown, and the descent extent showed the tendency gradually recovered to the temperature before pasting, after holding the cooling state for 60 minutes.

[0023] On the other hand, as shown in a dotted line B, as for the cooling sheet agent of the comparative example, the skin temperature of the pasting part descended quickly after pasting, but the minimum skin temperature was reached in after-pasting 6 minutes and 00 seconds, and the descent extent was skin temperature only with low 2.5 degrees C as compared with pasting before. Temporal duration was about 30 minutes short, showed the recovery tendency immediately and recovered it to the skin temperature before pasting mostly in after-pasting about 100 minutes.

[0024] The characteristics in which the cooling sheet of the work example 1 concerning this invention was far excellent in the cooling rate of a pasting part, the grade of cooling, and all the temporal duration as compared with the cooling sheet agent of a comparative example were acquired from the above result.

[0025] Next, the work example 2 which is a good form [ \*\*\*\* ] is given to this invention, and this invention is explained concretely. [Work example 2] The cooling sheet of a work example 2 arranges in parallel the break (cut part) 4 penetrated on the cooling sheet of the work example 1 mentioned above at the upper layer 1, an intermediate layer 2, and a lower layer 3 by two or more, as shown in drawing 2. That is, on the cooling sheet (a=13 cmxb=5cm) of a work example 1, the c= 1-cm-wide break 4 is formed in nine regular intervals in parallel, and two rows of groups of the still more nearly same break are arranged. Then, the result of the

adhesive power comparative study of the following three sorts of cooling sheet agents is explained. 1) In the cooling sheet agent (comparative example explained in work example 1) comparative study method of cooling sheet agent (with no break) 3 comparative example of cooling sheet agent (break is entered: refer to drawing 2) 2 work example 1 of a work example 2, the all the members allergy history had no \*\*ed person at the five men of 21 years old - 35 years old of age.

[0026] And the cooling sheet agent was stuck on the \*\*ed person's front frame, and after pressing down by hand lightly, it returned to the usual life. Time until a sheet agent separates from a frame was measured per part. After one pasting was completed, and the \*\*ed person washed his face, \*\*\*\*(ed) the front frame, set the interval (state where it does not stick) of 30 minutes and stuck another analyte again, he examined like the above. Furthermore, a measure was similarly taken about the one remaining samples. However, when after-pasting 2 hours passed, the examination was ended, and about the analyte stuck on the frame at the time, it judged with 120 minutes or more. In addition, the cooling sheet agent (a break is entered) of the work example 2 made it to a rule [ lengthen / slightly ] right and left at the time of pasting. The test result in the above-mentioned conditions is shown in Table 5.

[0027]

[Table 5] The adhesive power comparative study result work example 2 of a cooling sheet agent A work example 1 Comparative example No.(super-high absorptivity fiber use) (super-high absorptivity fiber use) (ordinary absorptivity fiber use) 1 120 minutes or more 90 minutes 68 minutes 2 120 minutes or more 75 minutes 45 minutes 3 120 minutes or more 88 minutes 30 minute 4 120 minutes or more 112 minutes 43 minute 5 120 minutes or more 97 minutes 57-minute average 120 minutes or more 92.4 minutes 48.6 minutes

[0028] All five pasting for 120 minutes or more of the cooling sheet agent of the above-mentioned adhesive power comparative study result to the work example 2 was possible for the time of the end of test among five examples. On the other hand, what was able to be stuck was not till the end of test, and the cooling sheet agent of the work example 1 was the pasting time for 92.4 minutes in the average of five examples. Moreover, it was 68 minutes which it could be the longest and was able to be stuck, and the cooling sheet agents of the

comparative example were 48.6 minutes and the shortest pasting time of three kinds of the analytes in the average of five examples.

[0029] From the above result, the cooling sheet agent using a super-high absorptivity fiber extended the pasting time of the cooling sheet agent using the conventional nonwoven fabric of a comparative example twice [ about ], and pasting time was further extended by putting a break (cut part) 4 into the sheet agent itself further.

[0030] [ when not spoiling the feature of this invention, of course, are not what is limited to both the above-mentioned work examples, for example, used the upper layer of the cooling sheet as the nonwoven fabric of polyester (PET) in both work examples, but ] Things are [ that what is necessary is just what gives dry feelings, such as polypropylene (PP) and nylon, as a material ] also natural.

[0031]

[Effect of the Invention] While infiltrating the liquid which makes an intermediate layer the nonwoven fabric of the super-absorptivity fiber which consists of acrylic fiber which carried out super-water absorption processing, and has a chilling effect to this intermediate layer according to invention according to claim 1 The lower layer which becomes the side stuck to this intermediate layer's skin is used as the nonwoven fabric sheet which consists of a rayon fiber. The upper layer used as this intermediate layer's outside is used as the nonwoven fabric which consists of a fiber which mixed which fiber of polyester (PET) polypropylene (PP) nylon, or these. [ an intermediate layer ] since a lot of moisture is absorbed by the super-absorptivity fiber since it was considered as the cooling sheet agent which combined the nonwoven fabric of three layers by twining the layer of each nonwoven fabric [ a lot of moisture which the surface always maintained the dry feeling since the increase also of durability and the upper layer were the nonwoven fabrics of the fiber which does not absorb moisture while the cooling operation increased, and was absorbed by the super-absorptivity fiber ] It evaporates and a steam is emitted outside from the crevice between the eyes of a nonwoven fabric, evaporation of a liquid is promoted and the effect that a cooling operation increases is acquired. Moreover, since the lower layer of the cooling sheet considered it as the nonwoven fabric which consists of a rayon fiber The effect that the adhesion to skin improves is acquired, it is not necessary to

use adhesives and the effect that binding of three layers is not cleared with moisture is acquired by having twined the fiber of each layer by the needle punch method etc. in piles, and having combined the nonwoven fabric of three layers with the physical variance (mechanical) further.

[0032] According to invention according to claim 2, in addition to the composition of Claim 1, the break penetrated in a lower layer from the upper layer is prepared in a cooling sheet. Since this break considered it as the cooling sheet agent arranged in parallel by plurality, if the direction of a break is pulled in the right-angled direction and it hits against skin, the effect that the adhesion to skin improves further will be acquired.

#### [Brief Description of the Drawings]

[Drawing 1] It is the figure which used change of the skin skin temperature by use of the cooling sheet agent of the work example 1 of this invention, and the cooling sheet agent of a comparative example as the graph.

[Drawing 2] It is the perspective view of the cooling sheet agent of the work example 2 of this invention.

[Explanations of letters or numerals] A [ ... Intermediate layer 3 of a cooling sheet agent / ... Lower layer 4 of a cooling sheet agent / ... Break (cut part) ] ... Cooling sheet agent B of a work example ... Cooling sheet agent 1 of a comparative example ... The upper layer 2 of a cooling sheet agent



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[Translation done.]

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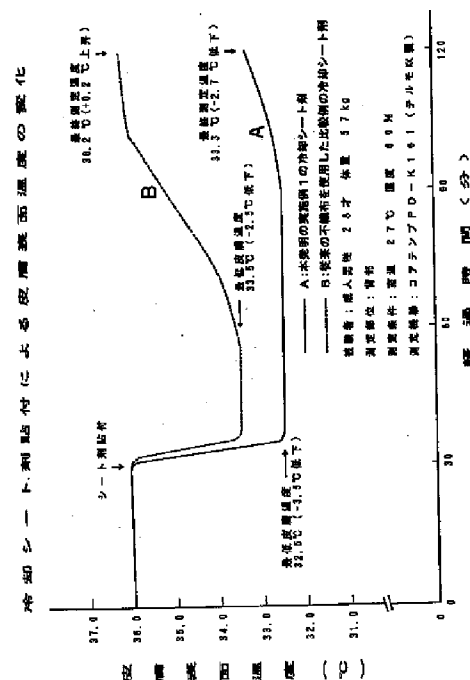
Fターム(参考) 4C099 AA02 EA05 GA01 GA02 HA09  
LA02 LA05

(54)【発明の名称】 冷却シート剤

(57)【要約】

【課題】 冷却シート剤の支持体自体、例えば、不織布自体に水分、アルコール等を多量に含有させることによって、揮発の量を増やし、冷却効果の持続時間を長くし、水分、アルコール等の揮発成分の蒸散力・気化力を上げて患部の冷却効果を高め、さらに、肌への密着性を高めた冷却シートを提供することである。

【解決方法】 超吸水加工したアクリル繊維からなる超吸収性繊維の不織布を中間層とし、該中間層には冷却効果のある液体を含浸させるとともに、該中間層の肌に密着する側となる下層をレーヨン繊維からなる不織布シートとし、該中間層の外側となる上層をポリエステル(PE T)・ポリプロピレン(PP)・ナイロンの何れかの繊維またはこれらを混紡した繊維からなる不織布とし、各不織布の層を絡ませることにより三層の不織布を結合した冷却シート剤である。



## 【特許請求の範囲】

【請求項1】超吸水加工したアクリル繊維からなる超吸収性繊維の不織布を中間層とし、該中間層には冷却効果のある液体を含浸させるとともに、該中間層の肌に密着する側となる下層をレーヨン繊維からなる不織布シートとし、該中間層の外側となる上層をポリエステル(PET)・ポリプロピレン(PP)・ナイロンの何れかの繊維またはこれらを混紡した繊維からなる不織布とし、各不織布の層を絡ませることにより三層の不織布を結合したことを特徴とする冷却シート剤。

【請求項2】前記冷却シートには、上層から下層に貫通する切れ目を設け、該切れ目は複数で平行に配置されたことを特徴とする請求項1に記載の冷却シート剤。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、医療用及び美容用のために皮膚を冷却する冷却シート剤の技術分野に属する。

## 【0002】

【従来の技術】従来、医療用及び美容用の一般的に使用される冷却シート剤として、比較的水分を多く吸収する水溶性高分子を主体としたゲル膏体を不織布に展延・塗布したものが知られている。

## 【0003】

【発明が解決しようとする課題】上記の従来の医療用及び美容用の一般的に使用される冷却シート剤は、水溶性高分子が水を含んでゲル化したものを、肌に当てることによって冷却するが、水の吸収量には限界があり、必ずしも十分な量を吸収できるものではなく、通常、水溶性高分子であるので一定量のアルコールしか含有することが出来ず水分の揮発率も悪く、従って、冷却効果も不十分であった。また、水溶性高分子による粘着基材が肌に残り、肌にかぶれが生ずることがあるといった問題点があった。

【0004】また、医療用及び美容用の一般的に使用される冷却シート剤として、比較的水分を多く吸収する繊維からなる不織布を水分吸収層とし、外層は水が漏れないようにコーティング材を接着剤等で密封処理し、コーティング材としては、ポリエチレン(PE)、ポリプロピレン(PP)、エチレン酸ビニル(EVA)、ポリスチレン(PS)等のフィルムが考えられるが、通常の吸水性の不織布でも冷却効果のある水・アルコール等の液状の揮散成分をを多量に含有させるには不十分であって、冷却作用が長続きせず、冷却シート内の液状の揮散成分の気体は、密封フィルムに阻止され、外部に発散することがなく、冷却作用が阻害されるという問題点があり、通常の水分を吸収する不織布も、肌に対する密着性は悪いという問題点があり、水分吸収層の不織布と、外層のフィルムとは接着剤等を用いているが、接着剤が水等により溶けて各層が解離するという問題もあり、溶けた接着剤自体が皮膚の

カブレ、痒み等の皮膚障害を生じさせるという問題点もある。

【0005】本発明は、上記の問題点に鑑みてなされたもので、その課題は、冷却シート剤の支持体自体、例えば、不織布自体に水分、アルコール等を多量に含有させることによって、揮発の量を増やし、冷却効果の持続時間を長くし、水分、アルコール等の揮発成分の蒸散力・気化力を上げて患部の冷却効果を高め、さらに、肌への密着性を高めた冷却シートを提供することである。

## 10 【0006】

【課題を解決するための手段】上記の課題を解決するために、請求項1に記載の発明は、超吸水加工したアクリル繊維からなる超吸収性繊維の不織布を中間層とし、該中間層には冷却効果のある液体を含浸させるとともに、該中間層の肌に密着する側となる下層をレーヨン繊維からなる不織布シートとし、該中間層の外側となる上層をポリエステル(PET)・ポリプロピレン(PP)・ナイロンの何れかの繊維またはこれらを混紡した繊維からなる不織布とし、各不織布の層を絡ませることにより三層の不織布を結合した冷却シート剤である。その作用は、中間層は超吸水性繊維に多量の水分が吸収されるので、冷却作用が高まるとともに持続性も増し、上層は水分を吸収しない繊維の不織布であるので表面は常にドライ感を維持し、また、超吸水性繊維に吸収された多量の水分は、蒸発して水蒸気が不織布の目の隙間から外部に放出され、液体の蒸発が促進され冷却作用が高まる。また、冷却シートの下層はレーヨン繊維からなる不織布としたから、肌への密着性が向上する作用を有する。さらに、三層の不織布を重ねてニードルパンチ法等により各層の繊維を絡ませて物理的(機械的)に結合したことにより、水分によって三層の結合が解けることがないという作用を有する。

【0007】上記の課題を解決するために、請求項2に記載の発明は、請求項1の構成に加えて、冷却シートの上層から下層に貫通する切れ目を設け、この切れ目は複数で平行に配置された冷却シート剤であり、その作用は、切れ目の方向とは直角方向に引張って肌に当てれば、肌への密着性が更に向上する。

## 【0008】

【発明の実施の形態】以下、本発明に良好な実施形態である実施例及び比較例を挙げて本発明を具体的に説明する。

【0009】【実施例1】実施例1は、医療用及び美容用の冷却シート剤であるが、使用する支持体として超吸水性繊維ランシールF(登録商標：東洋紡績株式会社)を使用する。この超吸水性繊維は、特殊な方法で超吸水加工した外層とアクリル繊維である内層を持つ2層構造であり、水に接触するとすみやかに吸水して膨潤し、繊維物性は芯はアクリル繊維のままであるからアクリル繊維の物性を維持した複合機能繊維である。そして、上記超吸

水性繊維ランシールFの物性は次のようなものがある。

【0010】

【表1】

デニール×繊維長	1.5d×51mm
吸水量 純水(蒸留水)(a)	150ml/g
0.9%食塩水	50ml/g
荷重下の保水量 1%食塩水(b)	20ml/g

【0011】ただし、上記(a)の吸水量の測定は、0.4gの超吸水性繊維ランシールFを300ml純水に浸漬し、攪拌しながら30分間放置し、その後32メッシュのふるい上に注いで10分間水切りをし、メッシュ上に残ったゲル状の超吸水性繊維ランシールFの量を次式により計算する。

【0012】

【数1】吸水量(ml/g) = (ゲル重量 - 0.4) / 0.4

【0013】また、上記(b)の荷重下の保水量の測定は、10cm×10cmの超吸水性繊維ランシールFの不織布に1%食塩水を十分吸水させ(約50ml/g)、水切りをした後これに5kgの荷重をのせて、その後の不織布の重量を計測する。そして、上記のように、超吸水性繊維は多量の水を吸収し、多少の圧力を加えても離水せず、吸水速度もはやく30秒で平衡吸水量の70%に達し、膨潤して元のアクリル繊維の直径の約12倍にもふくれる。また、毒性はなく、かつ、強度もアクリル繊維より低下しないという特性を有する。

【0014】ここで、実施例1の冷却シートは下記の【表2】に示すように、使用する支持体として上記の超吸水性繊維を用いるが、本冷却シート剤を中間層とし、中\*

【実施例1の冷却シートの構成】

材質	繊維(デニール×繊維長)	組織	使用量
上層 : ポリエステル(PET)	1.5d×51mm 90重量% 6.0d×64mm 10重量%	不織布	50g/m <sup>2</sup>
中間層 : 超吸水性繊維 (ランシールF(登録商標: 東洋紡績株式会社))	1.5d×51mm 100重量%	不織布	80g/m <sup>2</sup>
下層 : レーヨン (スパンレース: ジェット水流で交絡した不織布)	1.5d×38mm 100重量%	不織布	30g/m <sup>2</sup>

【0018】

※ ※【表3】

【比較例の冷却シートの構成】

材質	繊維(デニール×繊維長)	組織	使用量
上層 : ポリエステル(PET)	1.5d×51mm 90重量% 6.0d×64mm 10重量%	不織布	50g/m <sup>2</sup>
中間層 : レーヨン	1.5d×51mm 100重量%	不織布	80g/m <sup>2</sup>
下層 : レーヨン (スパンレース)	1.5d×38mm 100重量%	不織布	30g/m <sup>2</sup>

【0019】ここで、ポリアクリル酸ナトリウムを60～70℃加温下にて攪拌しながら精製水に溶解したのち常温にて放置し、エチルアルコールを添加して良く混合して浸漬液を調整した。この浸漬液に上記の【表2】の実施例1の冷却シート(13cm×5cm)、および、【表3】の比較例の冷却シート(13cm×5cm)を約5分間浸漬したのち

\* 間層の肌に密着する側となる下層はレーヨン繊維からなる不織布とし、該中間層の外側となる上層は液体を殆ど吸収しないポリエステル(PET)の不織布とし、三層の不織布を重ねてニードルパンチ法により各層を結合し、冷却シートの全体の厚みをほぼ1.3mm程度とした。(実施例2についての図2における上層1、中間層2、下層3を参照)

【0015】このようにして、製造された冷却シートの上層は、水分を吸収しないポリエステル(PET)の不織布であるので表面は常にドライ感を維持し、また、超吸水性繊維に吸収された多量の水分は、蒸発して水蒸気が不織布の目の隙間から外部に放出され、液体の蒸発が促進され冷却作用が高まる。また、冷却シートの下層は、肌への密着性を向上させるためにレーヨン繊維からなる不織布とした。更に、超吸水性繊維は多量の精製水を吸収するから、上層・中間層・下層の結合は、粘着剤等の使用は不適当であり、上記のように、三層の不織布を重ねてニードルパンチ法により各層の繊維を絡ませて物理的(機械的)に結合したことにより、多量の水分が存在しても三層の結合が解けることがない。

【0016】一方、実施例1の機能を説明するための比較例を説明するが、比較例の冷却シートは、実施例1の超吸水性繊維に代えて通常の冷却シートに使用されている不織布を用いるものであって、下記の【表3】に示すものである。

【0017】

【表2】

★取り出して試験用サンプルとした。両冷却シートの浸漬液の吸収量(最大)は、実施例1の冷却シートにおいては11.0 ml、比較例の冷却シートにおいては1.0mlであった。

【0020】なお、浸漬液の組成は以下の【表4】のようなものである。

【0021】

\* \* 【表4】

## 浸漬液の組成

エチルアルコール	5 重量部
ポリアクリル酸ナトリウム	0.2重量部
精製水	94.8重量部
総合計	100.0重量部

【0022】比較試験方法は、上記方法で調整した両冷却シート剤を室温27℃、湿度60%の室内条件下で健康な28歳成人男性(体重57kg)の左背部に貼付し、コアテンパPD-K161(テルモ株式会社製)を用いて貼付部位の皮膚温度を経時的に測定した。また、3時間後に同一被験者を使って同一条件下で、比較例の冷却シート剤を被験者の右背部に貼付し、上記と同様な方法で貼付部位の皮膚温度を測定した。上記の実施例1と比較例との実験結果を図1のグラフに示すが、実線Aに示すように、本発明の実施例の冷却シート剤は、貼付後に貼付部位の皮膚温度は急速に下降し、貼付後6分00秒で最低皮膚温度に達し、その下降程度は貼付前に比較して約3.5℃低い皮膚温度を示し、60分間その冷却状態を保持したのち、徐々に貼付前の温度に回復する傾向を示した。

【0023】これに対して、点線Bに示すように比較例の冷却シート剤は、貼付後に急速に貼付部位の皮膚温度は下降したが、貼付後6分00秒で最低皮膚温度に達し、その下降程度は貼付前に比較して2.5℃だけ低い皮膚温度であった。持続時間は短く約30分程度であり、すぐに回復傾向を示し、貼付後約100分ではほぼ貼付前の皮膚温度に回復した。

【0024】以上の結果から、本発明に係る実施例1の冷却シートは、比較例の冷却シート剤に比較して、貼付部位の冷却速度、冷却の程度及びその持続時間の全てにおいて遥かに優れた特性が得られた。

【0025】次に、本発明に良好な実施形態である実施例2を挙げて本発明を具体的に説明する。

[実施例2] 実施例2の冷却シートは、図2に示すよう ※

## 冷却シート剤の粘着力比較試験結果

	実施例2	実施例1	比較例
No.	(超高吸水性繊維使用)	(超高吸水性繊維使用)	(普通の吸水性繊維使用)
1	120分以上	90分	68分
2	120分以上	75分	45分
3	120分以上	88分	30分
4	120分以上	112分	43分
5	120分以上	97分	57分
平均	120分以上	92.4分	48.6分

【0028】上記の粘着力比較試験結果から、実施例2の冷却シート剤は5例中5例ともに試験終了時まで120分以上の貼付が可能であった。これに対して実施例1の冷却シート剤は試験終了時まで貼付可能であったものは無く、5例の平均で92.4分の貼付時間であった。また、比較例の冷却シート剤は一番長く貼付可能であったものでも68分であり、5例の平均で48.6分と3★50

※に、上述した実施例1の冷却シートに上層1、中間層2、下層3に貫通する切れ目(カット部)4を、複数本で平行に配置したものである。即ち、実施例1の冷却シート(a=13cm×b=5cm)に、巾c=1cmの切れ目4を平行に等間隔に9個設け、さらに同じ切れ目の群を2列配置したものである。そこで、以下の3種の冷却シート剤の粘着力比較試験の結果を説明する。

- 1) 実施例2の冷却シート剤(切れ目入り：図2参照)
- 2) 実施例1の冷却シート剤(切れ目無し)
- 3) 比較例の冷却シート剤(実施例1で説明した比較例)

比較試験方法において、被検者は年齢21歳～35歳の男性5名で、全員アレルギー歴は無しであった。

【0026】そして、被検者の前額部に冷却シート剤を貼付し、軽く手で押さえたのち通常の生活に戻した。シート剤が額部から剥がれるまでの時間を分単位で測定した。被検者は1回の貼付が終了したのち、洗顔して前額部を清拭し、30分の間隔(非貼付状態)において別の被検体を再び貼付した後、前記と同様に試験した。更に残りの1検体についても同様に処置した。ただし、貼付後2時間が経過した時点で試験を終了し、その時点で額部に貼付している被検体に関しては、120分以上と判定した。なお、実施例2の冷却シート剤(切れ目入り)は貼付時に左右に軽度には伸ばすことを原則とした。上記条件での試験結果を表5に示す。

【0027】

【表5】

★種類の被検体の中では最も短い貼付時間であった。

【0029】以上の結果から、超高吸水性繊維を利用した冷却シート剤は従来の不織布を利用した比較例の冷却シート剤の貼付時間を約2倍に延長し、更にシート剤自体に切れ目(カット部)4を入れることによって貼付時間は、より一層延長した。

【0030】本発明の特徴を損なうものでなければ、上

記の両実施例に限定されるものでないことは勿論であり、例えば、両実施例においては、冷却シートの上層をポリエステル(PET)の不織布としたが、素材としてポリプロピレン(PP)やナイロン等のドライ感を持たせるものであれば良いことも勿論である。

#### 【0031】

【発明の効果】請求項1に記載の発明によれば、超吸水加工したアクリル繊維からなる超吸収性繊維の不織布を中間層とし、該中間層には冷却効果のある液体を含浸させるとともに、該中間層の肌に着する側となる下層をレーヨン繊維からなる不織布シートとし、該中間層の外側となる上層をポリエステル(PET)・ポリプロピレン(PP)・ナイロンの何れかの繊維またはこれらを混紡した繊維からなる不織布とし、各不織布の層を絡ませることにより三層の不織布を結合した冷却シート剤としたから、中間層は超吸水性繊維に多量の水分が吸収されるので、冷却作用が高まるとともに持続性も増し、上層は水分を吸収しない繊維の不織布であるので表面は常にドライ感を維持し、また、超吸水性繊維に吸収された多量の水分は、蒸発して水蒸気が不織布の目の隙間から外部に放出され、液体の蒸発が促進され冷却作用が高まるという効果が得られる。また、冷却シートの下層はレーヨン繊維からなる不織布としたから、肌への密着性が向上するという効果が得られ、さらに、三層の不織布を重ねてニ-

ドルパンチ法等により各層の繊維を絡ませて物理的(機械的)に結合したことにより、接着剤を使用する必要がなく、水分によって三層の結合が解けることがないという効果が得られる。

【0032】請求項2に記載の発明によれば、請求項1の構成に加えて、冷却シートには上層から下層に貫通する切れ目を設け、この切れ目は複数で平行に配置された冷却シート剤としたから、切れ目の方向とは直角方向に引張って肌に当てれば、肌への密着性が更に向上するという効果が得られる。

#### 【図面の簡単な説明】

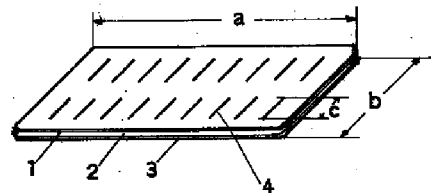
【図1】本発明の実施例1の冷却シート剤と比較例の冷却シート剤の使用による皮膚表面温度の変化をグラフにした図である。

【図2】本発明の実施例2の冷却シート剤の斜視図である。

#### 【符号の説明】

- A・・・実施例の冷却シート剤
- B・・・比較例の冷却シート剤
- 1・・・冷却シート剤の上層
- 2・・・冷却シート剤の中間層
- 3・・・冷却シート剤の下層
- 4・・・切れ目(カット部)

【図2】



【図1】

